

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-241049

(43)Date of publication of application : 07.09.1999

(51)Int.Cl.

C09J 7/00  
 B32B 27/00  
 C09D161/28  
 C09D167/08  
 C09D183/10  
 H01B 5/14  
 H01R 11/01

(21)Application number : 10-045067

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(22)Date of filing : 26.02.1998

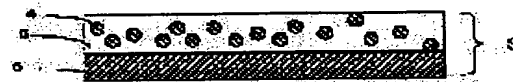
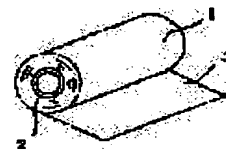
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## (54) ANISOTROPIC CONDUCTIVE ADHESIVE FILM WIND-UP ROLL

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide an anisotropic conductive adhesive film wind-up roll having no trouble of the transfer of an anisotropic conductive adhesive to the back of a base film and of no releasing of the adhesive from the base film in temporary bonding of the anisotropic conductive adhesive onto an adherend, and having no problem in connection reliability and adhesion properties such as adhesion strength.

**SOLUTION:** In an anisotropic conductive adhesive film wind-up roll 1 formed by multiply winding up a tape 3 having an anisotropic conductive adhesive layer formed on a releasable film base having different release properties between the front and back thereof on a core tube 2, the releasable film base used has one surface coated with a fluoroalkylsilane compound and the other surface coated with a cured material of an alkyd resin having a polysilicone side chain or a polyolefin side chain and a melamine resin, and an adhesive resin layer 5 in which conductive particles 4 are dispersed is formed on the surface coated with the cured material of an alkyd resin having a polysilicone side chain or a polyolefin side chain and a melamine resin.



## LEGAL STATUS

[Date of request for examination]

27.11.2000

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

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**CLAIMS**

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[Claim(s)]

[Claim 1] One field of a detachability film base material is coated with the phloroalkyl silane compound. And it sets to the detachability film base material coated with the field of another side with the hardened material of the alkyd resin and melamine resin which have a polysilicon cone side chain or a polyolefine side chain. the tape in which the different direction electroconductive-glue layer was formed on the field which coated the hardened material of the alkyd resin and melamine resin which have a polysilicon cone side chain or a polyolefine side chain -- the volume heart -- a multiplex volume pile -- \*\* -- the different direction conductivity adhesive-film volume serious condition characterized by things

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DETAILED DESCRIPTION

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## [Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the different direction conductivity adhesive-film volume serious condition used for connection between LCD (liquid crystal display) and TCP (tape carrier package), and the electrical installation of detailed circuits, such as connection between TCP and PCB (printed circuit board).

[0002]

[Description of the Prior Art] In recent years, the detailed connection method using the different direction electroconductive glue has been used abundantly in various detailed circuit connection processes, such as LCD, TCP, and connection between TCP and PCB. A different direction electroconductive glue is what distributed conductive particles, such as a synthetic-resin particle which has a metal layer on metal particles, such as nickel, and iron, cobalt, or a front face in adhesive resins, such as various thermosetting resin, such as an epoxy resin, and thermoplastics. a member [ exists and ] to connect with as operation -- a different direction electroconductive glue is inserted in between, it pastes up by carrying out heating pressurization, an electric flow is obtained between up-and-down terminals, and electric insulation is maintained between the contiguity terminals of the direction of a field

[0003] There is a different direction conductivity adhesive-film volume serious condition of the shape of a roll which rolled and put what put the different direction electroconductive glue of the shape of the shape of liquid or a paste in suitable containers, such as a syringe, as the product gestalt, and the thing of the shape of a tape of having formed this different direction electroconductive-glue layer on the film base material with flexibility which is mentioned to JP,61-55809,A on the suitable winding core in such a different direction electroconductive glue. Especially, after this different direction conductivity adhesive-film volume serious condition supplies a different direction electroconductive glue continuously by uniform thickness and width of face to an adherend and it carries out tacking to an adherend, in order that it may remove a base-material film and may leave only a different direction electroconductive glue on an adherend, it has the feature of leading also to automation of an adhesion connection process, and an adhesion precision rise. Moreover, it can respond also to the adhesion side of a narrow width extremely like the frame of the LCD panel possible [ also considering as the roll of a narrow width more ]. Moreover, it is also possible to be able to supply as a sheet to an adherend as a double-width roll conversely, and for an adherend with a big area and many adherends to be put in block, and to make adhesion connection. For a certain reason, the feature that no fear of contamination of the adherend by liquid sagging and the cobwebbing about which we are furthermore anxious by the different direction electroconductive glue of the shape of the shape of liquid or a paste, or its edge strip is is also in use as a product gestalt of a present different direction electroconductive glue.

[0004] However, in such a different direction conductivity adhesive-film volume serious condition, there was a problem that the trouble in which a different direction electroconductive glue carries out \*\* arrival to a base-material film tooth back in case it begins to wind at the time of use and carries out until now, and the trouble which does not separate from a base-material film in case tacking of the different direction electric conduction adhesives is carried out on an adherend occurred.

[0005] In order to solve such a problem, controlling the adhesion to the different direction electroconductive glue of a base-material film was also proposed by combining various surface treatment, such as silicon mold release processing, and surface roughening, plasma treatment, so that it may be mentioned to JP,4-87118,U.

[0006] However, when detachability processing of silicon mold release processing etc. is performed to base-material films, such as a polyethylene terephthalate which does not have detachability from the first, and the adhesion of the front reverse side is changed, it is. Although the detachability from that there is no \*\* arrival trouble on the tooth back of a base material of a different direction electroconductive glue or a base material is good According to the solvent

resistance of a remover, the adhesion of a base-material film and a remover, the kind of adhesives, etc. In order that a fear of receiving the degradation of the different direction electroconductive glue by a remover shifting to the abnormalities of detachability ability or the front face of an adhesives layer, the pollution trouble of an adherend, etc. may remain, It did not need to go to the reason for saying that what performed what detachability processing may be used, but the optimal detachability processing for a different direction conductivity adhesive-film volume serious condition needed to be performed.

[0007] Moreover, for example, there was detachability from the first, surface roughening and plasma treatment were performed to the base-material film made of a fluororesin, when the difference of the front reverse side was attached by raising the adhesion of one field, adhesion became high too much conversely to the different direction electroconductive glue, it might not separate from a base-material film, and there was a problem that a treatment effect may not continue for a long period of time.

[0008] Although the proposal of, making two-layer a different direction electroconductive-glue layer which is mentioned to JP,6-103818,A on the other hand, and preparing the low layer of adhesion with a base-material film in the best layer was also made, the application process to a base-material film top was needed twice, and there were problems, such as complication of a manufacturing process and a cost rise. Furthermore, although there was also a product gestalt which sandwiched the different direction electroconductive-glue layer with two kinds of base-material films with which adhesion differs, there are also problems, like cost rises and wastes increase in number, and it was not able to be said that it was enough.

[0009]

[Problem(s) to be Solved by the Invention] this invention is made in view of such a problem of the conventional technology as a result of various examination. In the different direction conductivity adhesive-film volume serious condition by which the purpose is used for connection between LCD and TCP, and the electrical installation of detailed circuits, such as connection between TCP and PCB In case tacking of the different direction electric conduction adhesives is carried out on the \*\* arrival trouble of the different direction electroconductive glue on the tooth back of a base-material film, or an adherend, there is no trouble where it does not separate from a base-material film, and it is going to offer the different direction conductivity adhesive-film volume serious condition which does not have a problem in adhesion properties, such as connection reliability,, either.

[0010]

[Means for Solving the Problem] This invention person Had generated in a conventional different direction conductivity adhesive-film volume serious condition. As opposed to generating of the trouble in which a different direction electroconductive glue carries out \*\* arrival to a base-material film tooth back in case it begins to wind at the time of use and carries out, and the trouble where it does not separate from a base-material film in case tacking of the different direction electric conduction adhesives is carried out on an adherend In order to solve those troubles by considering as the different direction conductivity adhesive-film volume serious condition which used the detachability film base material from which the detachability of the front reverse side differs It was examining acquiring the different direction conductivity film volume serious condition which used the optimal detachability film base material for the anxious different direction conductivity adhesive-film volume serious condition of the connection reliability fall about which we are anxious in case the detachability film base material which performed mold release processing is used, or an adhesion property fall which is not.

[0011] Consequently, one field is coated with a phloroalkyl silane compound. And the detachability film base material with which the field of another side is coated with the hardened material of the alkyd resin and melamine resin which have a polysilicon cone side chain or a polyolefine side chain The field which coated the phloroalkyl silane compound compares with the usual silicon release agent etc. with the phloroalkyl silyl machine contained to a phloroalkyl silane compound. Adhesion and solvent resistance with a film base material, The optimal as \*\*\*\*\* of the detachability film base material used for a different direction conductivity adhesive-film detachability film volume serious condition, since it excels in thermal resistance and the detachability to a different direction electroconductive glue, And the field which coated the hardened material of the alkyd resin and melamine resin which have a polysilicon cone side chain or a polyolefine side chain Since a principal chain is the hardened material of alkyd resin and melamine resin, adhesion and solvent resistance with a film base material, From excelling in thermal resistance, and having moderate detachability to a different direction electroconductive glue, since a side chain is a polysilicon cone or a polyolefine further It turns out that it is the optimal as the heavy surface of separation (field which forms the adhesive resin layer by which the conductive particle was distributed) of the detachability film base material used for a different direction conductivity adhesive-film detachability film volume serious condition.

[0012] It finds out that there is no trouble where it does not separate from a base-material film by that in case tacking of the different direction electric conduction adhesives is carried out by using the above-mentioned detachability film

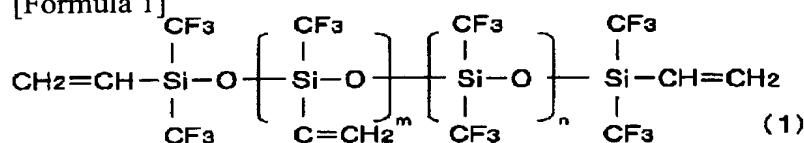
base material on the \*\* arrival trouble of the different direction electroconductive glue on the tooth back of a base-material film or an adherend, and the different direction conductivity adhesive-film volume serious condition which has a problem also neither in connection reliability nor an adhesion property is acquired, and results in this invention. [0013] Namely, as for this invention, one field of a detachability film base material is coated with the phloroalkyl silane compound. And it sets to the detachability film base material coated with the field of another side with the hardened material of the alkyd resin and melamine resin which have a polysilicon cone side chain or a polyolefine side chain. the tape in which the different direction electroconductive-glue layer was formed on the field which coated the hardened material of the alkyd resin and melamine resin which have a polysilicon cone side chain or a polyolefine side chain -- the volume heart -- a multiplex volume pile -- \*\* -- it is the different direction conductivity adhesive-film volume serious condition characterized by things

[0014] As a film base material used for this invention, various film base materials, such as a polyethylene terephthalate, polyethylene, polypropylene, a polyamide, and a polyimide, can be used. Moreover, it is possible to also use the thing containing the thing, inorganic, or the organic filler which these film base materials can apply transparency, a translucency, and opaque all, and is colored, and the thing to which various surface treatment, such as a corona treatment, plasma treatment, and split-face-ized processing, was performed further beforehand.

[0015] It will not be limited especially if it is the compound which has a phloroalkyl silyl machine as a phloroalkyl silane compound in a molecule as shown, for example in a general formula (1) - a general formula (4).

[0016]

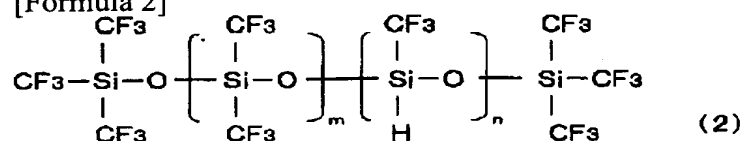
[Formula 1]



(The inside of a formula, the integer of m:1-100, integer of n:1-100)

[0017]

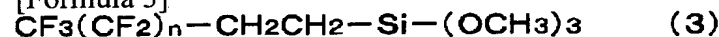
[Formula 2]



(The inside of a formula, the integer of m:1-100, integer of n:1-100)

[0018]

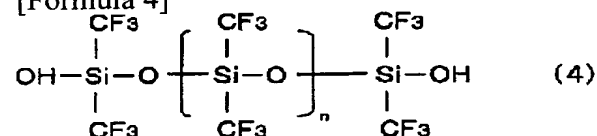
[Formula 3]



(The inside of a formula, integer of n:1-100)

[0019]

[Formula 4]

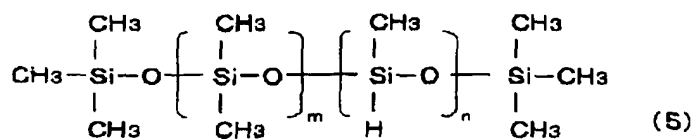


(The inside of a formula, integer of n:1-100)

[0020] Moreover, it is also possible to make it harden by heat-treatment, UV processing, the suitable catalyst, the cross linking agent, etc. depending on the kind of phloroalkyl silane compound, and to use. Furthermore, since detachability ability is controlled, it is also possible to mix and use the compound with which these phloroalkyl silane compound and a polysiloxane (for example, compound shown in a general formula (5) and (6)) with reactivity are blended in the range to which adhesion with a film base material, solvent resistance, thermal resistance, and the detachability to a different direction electroconductive glue do not fall, or phloroalkyl silyl machine contents differ.

[0021]

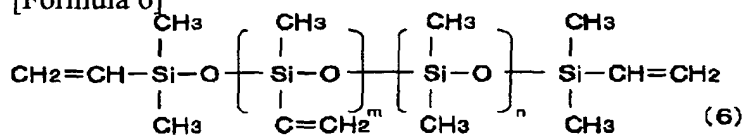
[Formula 5]



(The inside of a formula, the integer of m:1-100, integer of n:1-100)

[0022]

[Formula 6]



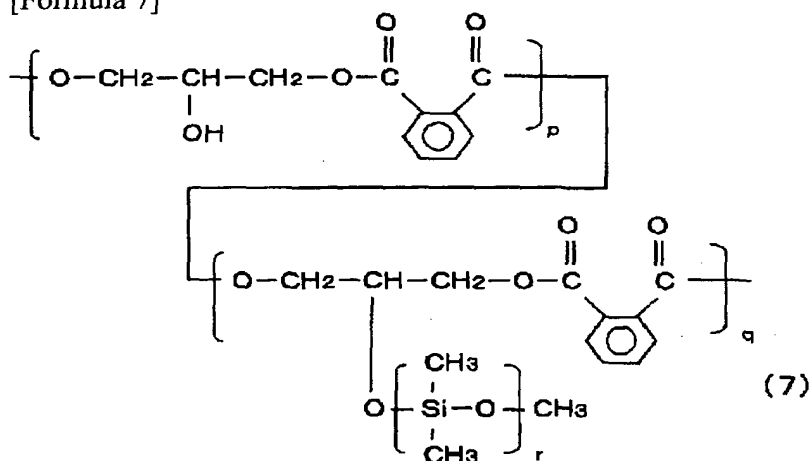
(The inside of a formula, the integer of m:1-100, integer of n:1-100)

[0023] The coating method at the time of applying on a film base material, the solvent to be used, coating \*\*, etc. can choose a suitable thing because of the kind of fluoro alkyl silane compound used, or detachability control. They cannot be overemphasized by that a suitable thing can be chosen with combination with the different direction electroconductive glue and film base material which are used. Furthermore, in case the film after coating is rolled round, by rolling round another film in piles, a phloroalkyl silane compound coating side can be protected, or it can also prevent that a phloroalkyl silane compound adheres to a coating tooth back.

[0024] If the hardened material of the alkyd resin and melamine resin which have a polysilicon cone side chain or a polyolefine side chain is stiffened by heat-treating the alkyd resin and melamine resin which have a polysilicon cone side chain or a polyolefine side chain as shown in a general formula (7) or a general formula (8), especially the ratio of alkyd resin and melamine resin etc. will not be the thing of the molecular weight of a principal chain, the molecular weight of a side chain, and a side chain limited comparatively.

[0025]

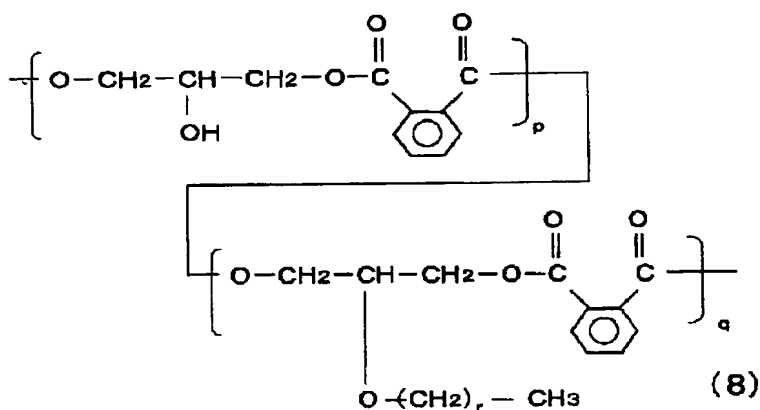
[Formula 7]



(Even if the repeating unit shown with the number p of recurrence and the repeating unit shown with the number q of recurrence are random, a block is sufficient as it)

[0026]

[Formula 8]



(Even if the repeating unit shown with the number p of recurrence and the repeating unit shown with the number q of recurrence are random, a block is sufficient as it)

[0027] Since detachability ability is controlled or an adhesion rise with thermal resistance, solvent resistance, and a film base material is aimed at, the thing of the molecular weight of a principal chain, the molecular weight of a side chain, and a side chain which the ratio of alkyd resin and melamine resin is changed, or two or more kinds are mixed comparatively, and is used is also possible.

[0028] As a conductive particle used for the different direction electroconductive glue of this invention, it is possible independent or to mix and to use metal particles, such as nickel, Co, aluminum, Ag, Au, Cu, and Fe, those alloys, or an oxide, for example. Moreover, what coated glass and the front face of synthetic resin with these metals can also be used. The content of an electric conduction particle, the size of a particle, and the kind of particle used of the ability of the insulation after adhesion, connection reliability, etc. to be considered and chosen from circuit width of face, the quality of the material, etc. of an adherend are natural.

[0029] an epoxy resin, a polyvinyl-acetal resin, an acrylonitrile-butadiene copolymer, an acrylate resin, a styrene-butadiene block copolymer, a styrene-isoprene block copolymer, polyester resin, an unsaturated polyester resin, a diallyl phthalate resin, phenol resin, a polyurethane resin, a maleimide resin, polyimide resin, etc. can be applied, and independent as an adhesive resin, -- or two or more kinds can be mixed and it can also use Moreover, various tackifiers, a plasticizer, a curing agent, a cross linking agent, a dispersant, a coupling agent, etc. can also be added and used.

[0030] Since a foreign matter is not attached to a different direction electroconductive glue compared with the thing made of paper, the quality of the material of the volume heart at the time of considering as a film volume serious condition has a desirable thing made from plastics. Moreover, volume length and width of face can consider operation, they can roll it round, carrying out a slit to another volume heart at a narrow width that what is necessary is just appropriately, after considering as the roll of long double width beforehand, and can also be made into the different direction conductivity adhesive-film volume serious condition of a narrow width.

[0031] According to this invention, the tape in which the different direction electroconductive-glue layer was formed on the detachability film base material from which the detachability of the front reverse side differs is set in a multiplex volume pile to the volume heart at \*\* and a different direction conductivity adhesive-film volume serious condition. One field of the detachability film base material used is coated with the phloroalkyl silane compound. And it is the detachability film base material coated with the field of another side with the hardened material of the alkyd resin and melamine resin which have a polysilicon cone side chain or a polyolefine side chain. Since a different direction electroconductive-glue layer is formed on the field which coated the hardened material of the alkyd resin and melamine resin which have a polysilicon cone side chain or a polyolefine side chain, In case tacking of the different direction electric conduction adhesives is carried out on the \*\* arrival trouble of the different direction electroconductive glue on the tooth back of a base-material film, or an adherend, there is no trouble where it does not separate from a base-material film, and the different direction conductivity adhesive-film volume serious condition which does not have a problem in adhesion properties, such as connection reliability,, either is acquired.

[0032]

[Example] Hereafter, an example and the example of comparison explain this invention.

[0033] (Example 1) 3% solution which dissolved the alkyd resin which has the polysilicon cone side chain shown in a general formula (7), and melamine resin in toluene at a rate of 3:1 was applied so that the weight of the resin after dryness might be set to about 0.2g per square meter on a polyethylene-terephthalate film, and it carried out heat

hardening through the dryer for 3 minutes at 150 degrees C. The varnish which added 0.1% of platinum catalysts in 2% solution which dissolved in n-hexane the phloroalkyl silane compound furthermore shown in one formula and two formulas in an opposite side at a rate of 1:1 was applied so that the weight of the resin after dryness might be set to about 0.1g per square meter, and it carried out heat hardening through the dryer for 2 minutes at 160 degrees C, and the double-sided detachability film base material was obtained.

[0034] On the field where the coat of the hardened material of the alkyd resin and melamine resin which have the polysilicon cone side chain of this detachability film base material is carried out The bisphenol A type liquefied epoxy resin (weight-per-epoxy-equivalent 200 g/eq) 100 weight section and the 2-methyl imidazole 20 weight section, In the solution which dissolved 40% of the weight into toluene, the polyvinyl-acetal resin (polymerization-degree 500 and degree-of-acetalization % of 70 mols) 70 weight section It becomes [ the thickness of the adhesive resin layer after dryness ] 25 microns about the different direction electroconductive-glue solution to which the amount of duplex partial powder of the electric conduction particle of about 10 microns of mean particle diameters which covered nickel on the front face of a polystyrene particle, and covered Au further was carried out and needs. It applied, and it rolled round to the volume heart made from vinyl chloride, carrying out stoving, and a different direction conductivity adhesive-film volume serious condition was acquired.

[0035] (Example 2) When producing a detachability film base material, a different direction conductivity adhesive-film volume serious condition as well as an example 1 was acquired except using the alkyd resin which has the polyolefine side chain shown in a general formula (8).

[0036] (Example 1 of comparison) When producing a detachability film base material, a different direction conductivity adhesive-film volume serious condition as well as an example 1 was acquired except not carrying out the coat of the phloroalkyl silane compound to one side of a film base material.

[0037] (Example 2 of comparison) When producing a detachability film base material, a different direction conductivity adhesive-film volume serious condition as well as an example 1 was acquired except not applying the alkyd resin which has a polysilicon cone side chain, and melamine resin.

[0038] (Example 3 of comparison) When producing a detachability film base material, a different direction conductivity adhesive-film volume serious condition as well as an example 1 was acquired except having used the silicone resin shown in a general formula (5) and a general formula (6) instead of a phloroalkyl silane compound at a rate of 1:1.

[0039] (Volume taking out the sex evaluation method) It took out with sufficient vigor with the edge of through and a different direction conductivity film centering on the volume heart of a different direction conductivity film volume serious condition, and O and the adhesive resin separated what is not a problem in any way from the film base material, and what carries out \*\* arrival to a base-material film tooth back was made into x.

[0040] (The tacking nature evaluation method) On glass with a thickness of 1.1mm, what was cut into 2mm width of face from a different direction electric conduction film volume serious condition was carried, and after carrying out heating pressurization for 2 seconds and sticking by the temperature of 70 degrees C, and pressure 5 kg/cm<sup>2</sup>, the double-sided detachability film base-material edge was picked up between its fingers with the pincettes. What separated that in which only the film base material separated O and the adhesive whole resin was made into x.

[0041] Copper foil/polyimide = (Production of a bond strength and a connection reliability evaluation sample) Between TCP (pitch 0.10mm, the number of terminals 200) which performed 0.4-micrometer tinning to 25/75 micrometer, and glass (following ITO glass) with a thickness [ in which with a sheet resistance / of 30 ohms / the indium / stannic-acid ghost coat were formed on the whole surface ] of 1.1mm. It cut into 2mm width of face from a different direction electric conduction film volume serious condition, the adhesive resin removed from the film base material was inserted, heating pressurization adhesion was carried out the condition for [ temperature / of 180 degrees C /, and pressure 30 kg/cm ] 2 or 20 seconds, and the evaluation sample was produced.

[0042] (Bond-strength measuring method) 90 degrees exfoliated the obtained evaluation sample in a part for 50mm/in hauling speed using tensilon, and it asked for the bond strength.

[0043] (The connection reliability evaluation method) The connection resistance between immediately after evaluation sample production and the temperature of 85 degrees C, 85% of humidity, and the contiguity terminal after 100-hour neglect was measured. Moreover, what cannot be measured was made into defective continuity (OPEN). The evaluation result of the above example and the example of comparison is shown in Table 1.

[0044]

[Table 1]



表 1

評価項目		単位	実施例		比較例		
			1	2	1	2	3
巻き出し性		—	○	○	×	○	○
仮付け性		—	○	○	○	×	○
接着強度		g/cm	800	800	800	(*)	500
接続信頼性 (絶縁抵抗)	接着直後	Ω	1.2	1.2	1.2	(*)	1.2
	85℃, 85%		1.8	1.8	1.8	(*)	3.5
	100時間後						

( ) 仮付けできないため測定不可

[0045]

[Effect of the Invention] According to this invention, in case tacking of the different direction electric conduction adhesives is carried out on the \*\* arrival trouble of the different direction electroconductive glue on the tooth back of a base-material film, or an adherend, there is no trouble where it does not separate from a base-material film, and the different direction conductivity adhesive-film volume serious condition which does not have a problem in adhesion properties, such as connection reliability and a bond strength,, either can be offered.

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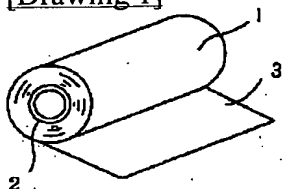
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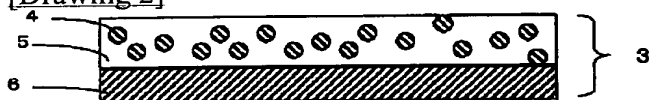
DRAWINGS

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[Drawing 1]



[Drawing 2]



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[Translation done.]